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Sedimentation In Kanopolis Reservoir Smoky Hill River - Kansas

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SEDIMENTATION IN THE
KANOPOLIS RESERVOIR
SMOKY HILL RIVER - KANSAS

By

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Introduction.—The Kanopolis Reservoir on the Smoky Hill River in central Kansas has been in operation, primarily in the interest of flood control, since 1946. In addition to the storage allocation for flood control, the reservoir has a permanent pool of 53,000 acre-feet to meet conservation and sedimentation requirements. Prior to the initial filling of the conservation-sediment pool, a series of ranges were established across the reservoir area in anticipation of future sedimentation surveys. Since 1942, a suspended sediment sampling station has been maintained at the stream gaging station at Ellsworth, Kansas, at the head of the reservoir. See Plate 1.

The Smoky Hill River is not a particularly heavy sediment carrier, and it was not anticipated that a survey of accumulated sediment in the reservoir would be necessary for several years. However, flood flows in 1950 with heavy sediment transport into the reservoir resulted in a noticeable deposition, and it was deemed advisable to make a survey in November 1950, only a little over four years after closure of the dam. Then, the following year experienced the record flood flows of 1951, and a second survey was made in November of that year. A third survey was made in September 1954, after the drought years of 1953 and 1954 tended to compensate for the previous flood years so far as the average rate of sedimentation was concerned.

Each of the sediment surveys was of the reconnaissance type; that is, each was made on the basis of a limited sampling of the deposits rather than employing the usual manpower, time and expense of a detailed sediment-range survey. In each case, a reconnaissance was considered adequate since sedimentation, as yet, presented no operational problem and the available records of sediment inflow could serve as a check on the survey results. This report presents the findings of the three surveys, and, also, illustrates the practicability of an inexpensive, rapid, reconnaissance-type sedimentation survey.

Kanopolis Dam and Reservoir.—Kanopolis Reservoir is located in Ellsworth County, about 25 miles southwest of Salina, Kansas. The dam was constructed and is operated as a unit in the comprehensive plan for flood control in the Kansas River and Missouri River Basins, by the Kansas City District, Corps of Engineers, under the general supervision of the Missouri River Division Office. The reservoir has a total capacity of 450,000 acre-feet, of which 397,000 acre-feet is for flood-flow impoundment and 53,000 acre-feet is sediment reserve and conservation allocation for supplementing low-water supply. At full flood pool elevation of 1508 feet, m.s.l., the reservoir would have an area of 13,900 acres and extend upstream 25 miles, almost to Ellsworth, Kansas. The permanent pool, at elevation 1459 feet, m.s.l., has an area of 3,550 acres and is 12 miles long. Prior to filling the reservoir, a series of sediment ranges, shown on Plate 1, was established and surveyed, thereby defining the original floor of the reservoir area.

Drainage area.—The basin of the Smoky Hill River above Kanopolis is long and narrow, extending 265 miles westward and having a maximum width